country occupied by our observers; such isotherms are controlled largely by the local topography, and should be drawn and studied in connection with a contour map.

The *highest mean* temperatures were: Key West, 74.8; Jupiter, 72.0; Titusville, 70.0. The *lowest mean* temperatures were: In the United States, St. Vincent and Williston, 20.0; Bismarck, 22.2; and in Canada, Prince Albert, 14.0; Minnedosa, 14.4; Qu'Appelle, 16.2; Winnipeg, 16.8.

As *compared with the normal* for October the mean temperature of the current month was in excess in the Middle States and New England, but elsewhere generally deficient.

The greatest excesses were: New Brunswick, 3.2; Vineyard Haven, 3.0; Boston, 2.7; Nantucket, 2.6; Eastport, 2.4. The greatest deficits were: Williston, 7.9; Bismarck, 6.7; Rapid City, 4.0; Pierre, 3.4; Abilene, 3.3.

Considered by districts the mean temperatures for the current month show departures from the normal as given in Table I. The greatest positive departure was: New England, 2.1. The greatest negative departures were: North Dakota, 4.8; Abilene (southern Slope), 3.3.

The years of highest and lowest mean temperatures for November are shown in Table I of the REVIEW for November, 1894. The mean temperature for the current month was the highest on record at: Eastport, 39.8; Boston, 45.4; Nantucket, 47.2; Vineyard Haven, 48.8; Harrisburg, 44.0. It was the lowest on record at: Fresno, 52.8; Eureka, 48.8; and Baker City, 34.2.

The *maximum and minimum temperatures* of the current month are given in Table I. The highest maxima were: Los Angeles (18th), 94; Key West (10th), Yuma (19th), San Diego (15th), Red Bluff (6th), 85; Jacksonville (9th), Tampa (8th), 84. The lowest maxima were: St. Vincent (17th), 48; Idaho Falls (2d), Baker City (1st), Spokane (19th), Tatoosh Island (15th), 56; Santa Fe (21st), 57. The highest minima were: Key West (21st), 63; Jupiter (21st), 48; Port Eads (26th), 45; Tampa (21st), San Francisco (26th), 42. The lowest minima were: St. Vincent (29th), —16; Williston (8th), —14; Moorhead (22d), Lander (24th), —12; Bismarck (22d), —11.

The limit of freezing weather is shown on Chart VI by the isotherm of minimum 32, and the limit of frost by the isotherm of minimum 40.

The years of highest maximum and lowest minimum temperatures for November are given in the last four columns of Table I. During the current month the maximum temperatures were the highest on record at: Portland, Me., 69; Nantucket, 66; Albany, 70; Harrisburg, 75; Port Huron, 69; Green Bay, 68; Columbus, Ohio, 77; Parkersburg, 78; Norfolk, 80; Columbia, S. C., 83; Cincinnati, 78; Lexington, 78; Louisville, 79; Tatoosh Island, 62; Eureka, 74; San Francisco, 83. The minimum temperatures were the lowest on record at: Eureka, 32; Fresno, 29; San Diego, 38.

The greatest daily range of temperature and the extreme monthly ranges are given for each of the regular Weather Bureau stations in Table 1, which also gives data from which may be computed the extreme monthly ranges for each station. The largest values of the greatest daily ranges were: Pueblo, 56; Winnemucca and San Luis Obispo, 48; Carson City, 47; Bismarck, Sioux City, and North Platte, 46; Amarillo and Fort Smith, 45; Dodge City, 44. The smallest values were: Key West, Tatoosh Island, and Fort Canby, 14; Astoria, 16; Galveston and Seattle, 17; Nantucket, Hatteras, East Clallam, and Port Angeles, 18; Charleston and Port Eads, 19. Among the extreme monthly ranges the largest values were: Lander, 78; North Platte, 77; Bismarck, 75; Williston, Huron, and Pueblo, 74; Moorhead and Denver, 73. The smallest values were: Fort Canby, 21; Key West, 22; Tatoosh Island, 23; Astoria, 24; Olympia, 29; Port Eads and Port Angeles, 31.

The *accumulated monthly departures* from normal temperatures from January 1 to the end of the current month are given in the second column of the following table, and the average departures are given in the third column, for comparison with the departures of current conditions of vegetation from the normal conditions.

Districts.	Accumulated departures.		Districts.	Accumulated departures.	
	Total.	Average.		Total.	Average.
	°	°		°	°
New England	+ 2.2	+ 0.2	Middle Atlantic	— 8.8	— 0.8
North Dakota	+ 0.2	0.0	South Atlantic	—16.5	— 1.5
Missouri Valley	+ 0.9	+ 0.1	Florida Peninsula	—13.5	— 1.2
Northern Plateau	+ 2.4	+ 0.2	East Gulf	—18.1	— 1.6
			West Gulf	—19.9	— 1.8
			Ohio Valley and Tenn.	—13.4	— 1.2
			Lower Lake	— 7.8	— 0.7
			Upper Lake	— 1.0	— 0.1
			Upper Mississippi	— 3.0	— 0.3
			Northern Slope	—12.0	— 1.1
			Middle Slope	— 6.0	— 0.5
			Abilene (southern Slope)	—21.6	— 2.0
			Southern Plateau	— 8.2	— 0.7
			Middle Plateau	—13.4	— 1.1
			North Pacific	— 3.7	— 0.3
			Middle Pacific	— 6.5	— 0.6
			South Pacific	— 8.7	— 0.8

MOISTURE.

The *quantity of moisture* in the atmosphere at any time may be expressed by the weight contained in a cubic foot of air, or by the tension or pressure of the vapor, or by the temperature of the dew-point. The mean dew-points for each station of the Weather Bureau, as deduced from observations made at 8 a. m. and 8 p. m., daily, are given in Table I.

The *rate of evaporation* from a special surface of water on muslin at any moment determines the temperature of the wet-bulb thermometer, but a properly constructed evaporometer may be made to give the *quantity* of water evaporated from a similar surface during any interval of time. Such an evaporometer, therefore, would sum up or integrate the effect of those influences that determine the temperature as given by the wet bulb; from this quantity the *average humidity of the air* during any given interval of time may be deduced.

Sensible temperatures.—The sensation of temperature experienced by the human body and ordinarily attributed to the condition of the atmosphere depends not merely on the temperature of the air, but also on its dryness, on the velocity of the wind, and on the suddenness of atmospheric changes, all combined with the physiological condition of the observer. The condition of the atmosphere as to moisture is so important that it has, by exaggeration, been sometimes considered as a controlling feature and the temperature of the wet-bulb thermometer, when whirled in the shade, has been called the sensible temperature, although this is often but a partial index of the sensation of temperature. In order to present a monthly summary of the atmospheric conditions on which hygienic and physiological phenomena depend, the moisture must be fully considered, and therefore Table VIII has been prepared, showing the maximum, minimum, and mean readings of the wet-bulb thermometer at 8 a. m. and 8 p. m., seventy-fifth meridian time. A complete expression for the relation between atmospheric conditions and nervous sensations is under consideration, but has not yet been obtained.

PRECIPITATION.

[In inches and hundredths.]

The *distribution of precipitation* for the current month, as determined by reports from about 2,500 stations, is exhibited on Chart III. The numerical details are given in Tables I, II, and III. The precipitation was heaviest, 8.00 to 12.00, over a small portion of the coasts of Oregon and Washington.

It slightly exceeded 6.00 over the greater part of those coasts, as also on portions of the coasts of Texas, North Carolina, and New England. A narrow ridge of 6.00 to 8.00 extended from central Arkansas to southern Indiana.

The *diurnal variation* is shown by Table XII, which gives the total precipitation for each hour of seventy-fifth meridian time, as deduced from self-registering gauges kept at about 43 regular stations of the Weather Bureau; of these 37 are float gauges and 6 are weighing gauges.

The *normal precipitation* for each month is shown in the Atlas of Bulletin C, entitled "Rainfall and Snow of the United States, compiled to the end of 1891, with annual, seasonal, monthly, and other charts."

The *departures* from the normal precipitation are given in Table I, which shows that there was an excess in New England, the Lake Region, Ohio Valley, south Atlantic Coast, and the northern and southern Rocky Mountain slopes.

Large excesses were: Boston, 3.40; Portland, Me., and Chicago, 2.00; Louisville, 2.90; Indianapolis, 2.89; Northfield and Hatteras, 2.60. Large deficits were: New Orleans, 3.80; Mobile, 3.50; Pensacola, 3.10; Atlanta, 3.00; Key West and Tatoosh Island, 2.40.

The average departure for each district is also given in Table I. By dividing these by the respective normals the following corresponding percentages are obtained (precipitation is in excess when the percentages of the normals exceed 100):

Above the normal: New England, 145; South Atlantic, 113; West Gulf, 112; lower Lake, 138; upper Lake, 116; North Dakota, 300; upper Mississippi, 109; Missouri, 112; northern Slope, 202; southern Plateau, 153.

Normal: Ohio Valley and Tennessee, 100; middle Slope, 100.

Below the normal: Middle Atlantic, 88; Florida Peninsula, 86; east Gulf, 30; Abilene, (southern Slope), 89; middle Plateau, 86; northern Plateau, 92; north Pacific, 86; middle Pacific, 85; south Pacific, 65.

The years of greatest and least precipitation for November are given in the REVIEW for November, 1894. The precipitation for the current month was the greatest on record at: Northfield, 5.68; Toledo, 5.03; Louisville, 7.01; Wichita, 1.80; Kansas City, 3.05; St. Vincent, 1.21; Williston, 1.91; Miles City, 0.77; Rapid City, 1.03; Lander, 2.30. It was the least on record at: Sault Ste. Marie, 1.51; Green Bay, 1.50; Port Eads, 0.64.

The *total accumulated monthly departures* from normal precipitation, from January 1 to the end of the current month, are given in the second column of the following table; the third column gives the ratio of the current accumulated precipitation to its normal value.

Districts.	Accumulated departures.	Accumulated precipitation.	Districts.	Accumulated departures.	Accumulated precipitation.
	Inches.	*Per ct.*		*Inches.*	*Per ct.*
Florida Peninsula	+ 0.10	100	New England	— 4.80	86
Abilene (southern Slope)	+ 5.80	122	Middle Atlantic	— 8.80	79
Southern Plateau	+ 0.80	108	South Atlantic	— 5.00	91
			East Gulf	— 7.90	85
			West Gulf	— 6.10	85
			Ohio Valley and Tenn.	—11.40	74
			Lower Lakes	— 7.40	77
			Upper Lakes	— 8.00	74
			North Dakota	— 0.80	96
			Upper Mississippi	— 8.80	74
			Missouri Valley	— 5.00	84
			Northern Slope	— 0.20	99
			Middle Slope	— 1.60	92
			Middle Plateau	— 1.80	83
			Northern Plateau	— 4.20	71
			North Pacific	— 8.70	83
			Middle Pacific	— 3.00	88
			South Pacific	— 3.20	77

Details as to excessive precipitation are given in Tables XIII and XIV. The total snowfall at each station is given in Table II. Its geographical distribution is given on Chart No. VI of total monthly snowfall. The isotherms of minimum 32° and 40° are also shown on this chart for comparison with the snow limit.

The depth of snow on the ground at the close of the month is shown on Chart VII.

HAIL.

The following are the dates on which hail fell at one or more stations in the respective States:

Arizona, 12. Arkansas, 25. California, 3. Colorado, 4. Connecticut, 2. Iowa, 6. Maryland, 10. Nebraska, 5. New Mexico, 4, 12. Oregon, 13, 20, 27 to 30. Rhode Island, 2. South Dakota, 5. Washington, 2, 28. West Virginia, 12, 28, 29.

SLEET.

The following are the dates on which sleet fell at one or more stations in the respective States:

Arizona, 2, 3, 4, 12, 23, 24, 25. Arkansas, 12, 24, 25. California, 3, 4, 5. Colorado, 4, 12, 21, 22. Connecticut, 2, 3, 24. Delaware, 2, 10. District of Columbia, 2, 10. Idaho, 2, 11, 13, 21, 27, 29. Illinois, 13, 19, 22 to 25. Indiana, 9, 16, 23 to 26. Indian Territory, 23, 24, 25. Iowa, 6, 7, 13, 16, 18, 19, 20, 22, 23, 24, 26, 28, 29, 30. Kansas, 12, 21 to 26, 30. Maine, 2, 21, 23, 25. Maryland, 2, 10, 26. Massachusetts, 2, 3, 10, 15, 22 to 25. Michigan, 8, 9, 15, 16, 19, 22 to 27, 29. Minnesota, 7, 13, 28, 29, 30. Mississippi, 12, 13. Missouri, 8, 9, 12, 14, 19, 20, 22 to 28, 30. Montana, 21. Nebraska, 6, 7, 13, 21, 24, 30. Nevada, 3, 4, 12, 26, 27, 29. New Hampshire, 2, 10, 14, 25, 26. New Jersey, 2, 10. New Mexico, 6, 12, 22. New York, 2, 20 to 27, 30. North Dakota, 5, 12, 13, 15, 20, 28, 29, 30. Ohio, 17 to 20, 23 to 26. Oklahoma, 6, 22, 23, 24. Oregon, 13, 14, 21. Pennsylvania, 2, 10, 22, 25, 26, 28, 29, 30. South Dakota, 7, 18, 21, 27, 28, 29. Tennessee, 10, 26. Texas, 23, 24, 25. Utah, 4, 12. Vermont, 21, 26. Virginia, 2, 10, 12, 17, 19. Washington, 10, 20, 21, 26, 27. West Virginia, 10, 20, 26. Wisconsin, 7, 8, 13, 15, 16, 19, 25, 29, 30.

SUNSHINE AND CLOUDINESS.

The quantity of sunshine, and therefore of heat, received by the atmosphere as a whole is very nearly constant from year to year, but the proportion received by the surface of the earth depends upon the absorption by the atmosphere, and varies largely with the distribution of cloudiness. The sunshine is now recorded automatically at 16 regular stations of the Weather Bureau by its photographic, and at 22 by its thermal effects. At one station records are kept by both methods. The photographic record sheets show the apparent solar time, but the thermometric sheets show seventy-fifth meridian time; for convenience the results are all given in Table XI for each hour of local mean time.

Photographic and thermometric registers give the duration of that intensity of sunshine which suffices to make a record, and, therefore, they generally fail to record for a short time after sunrise and before sunset, because, even in a cloudless sky, the solar rays are then too feeble to affect the self-registers. If, therefore, such records are to be used for determining the amount of cloudiness, they must be supplemented by special observations of the sky near the sun at these times. The duration of clear sky thus specially determined constitutes the so-called twilight correction (more properly a low-sun correction), and when this has been applied, as has been done in preparing Table XI, there results a complete record of clear sky from sunrise to sunset in the neighborhood of the sun. The twilight correction is not needed when the self-registers are used for ascertaining the duration of a special intensity of sunshine, but is necessary